

*Z-direction* means in the direction of the vehicle's Z-axis, which is perpendicular to the X- and Y-axes. The Z-direction is positive in a downward direction.

[73 FR 2180, Jan. 14, 2008]

EFFECTIVE DATE NOTE: At 76 FR 47486, Aug. 5, 2011, §563.5 was amended in paragraph (b), by revising the definitions of "end of event time," "event," "occupant size classification," and "time zero," removing the definition of "service brake, on and off", and adding a definition for "service brake, on or off", effective October 4, 2011. For the convenience of the user, the added and revised text is set forth as follows:

**§ 563.5 Definitions.**

\* \* \* \* \*

(b) \* \* \*

*End of event time* means the moment at which the resultant cumulative delta-V within a 20 ms time period becomes 0.8 km/h (0.5 mph) or less, or the moment at which the crash detection algorithm of the air bag control unit resets.

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*Event* means a crash or other physical occurrence that causes the trigger threshold to be met or exceeded, or any non-reversible deployable restraint to be deployed, whichever occurs first.

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*Occupant size classification* means, for the right front passenger, the classification of the occupant as a child (as defined in 49 CFR part 572, subpart N or smaller) or not as an adult (as defined in 49 CFR part 572, subpart O), and for the driver, the classification of the driver as being a 5th percentile female (as defined in 49 CFR Part 572, subpart O) or larger.

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*Service brake, on or off* means the status of the device that is installed in or connected to the brake pedal system to detect whether the pedal was pressed. The device can include the brake pedal switch or other driver-operated service brake control.

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*Time zero* means whichever of the following occurs first:

(1) For systems with "wake-up" air bag control systems, the time at which the occu-

pant restraint control algorithm is activated; or

(2) For continuously running algorithms,

(i) The first point in the interval where a longitudinal cumulative delta-V of over 0.8 km/h (0.5 mph) is reached within a 20 ms time period; or

(ii) For vehicles that record "delta-V, lateral," the first point in the interval where a lateral cumulative delta-V of over 0.8 km/h (0.5 mph) is reached within a 5 ms time period; or

(3) Deployment of a non-reversible deployable restraint.

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**§ 563.6 Requirements for vehicles.**

Each vehicle equipped with an EDR must meet the requirements specified in §563.7 for data elements, §563.8 for data format, §563.9 for data capture, §563.10 for crash test performance and survivability, and §563.11 for information in owner's manual.

**§ 563.7 Data elements.**

(a) *Data elements required for all vehicles.* Each vehicle equipped with an EDR must record all of the data elements listed in Table I, during the interval/time and at the sample rate specified in that table.

TABLE I—DATA ELEMENTS REQUIRED FOR ALL VEHICLES EQUIPPED WITH AN EDR

Data element	Recording interval/time <sup>1</sup> (relative to time zero)	Data sample rate (samples per second)
Delta-V, longitudinal .....	0 to 250 ms, or 0 to End of Event Time plus 30 ms, whichever is shorter.	100
Maximum delta-V, longitudinal.	0 to 300 ms, or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Time, maximum delta-V .....	0 to 300 ms, or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Speed, vehicle indicated .....	–5.0 to 0 sec	2
Engine throttle, % full (or accelerator pedal, % full).	–5.0 to 0 sec	2
Service brake, on/off .....	–5.0 to 0 sec	2
Ignition cycle, crash .....	–1.0 sec .....	N/A

TABLE I—DATA ELEMENTS REQUIRED FOR ALL VEHICLES EQUIPPED WITH AN EDR—Continued

Data element	Recording interval/time <sup>1</sup> (relative to time zero)	Data sample rate (samples per second)
Ignition cycle, download .....	At time of download <sup>3</sup> .	N/A
Safety belt status, driver .....	– 1.0 sec .....	N/A
Frontal air bag warning lamp, on/off <sup>2</sup> .	– 1.0 sec .....	N/A
Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, driver.	Event .....	N/A
Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, right front passenger.	Event .....	N/A
Multi-event, number of events (1, 2).	Event .....	N/A
Time from event 1 to 2 .....	As needed .....	N/A

TABLE I—DATA ELEMENTS REQUIRED FOR ALL VEHICLES EQUIPPED WITH AN EDR—Continued

Data element	Recording interval/time <sup>1</sup> (relative to time zero)	Data sample rate (samples per second)
Complete file recorded (yes, no).	Following other data.	N/A

<sup>1</sup>Pre-crash data and crash data are asynchronous. The sample time accuracy requirement for pre-crash time is –0.1 to 1.0 sec (e.g., T = –1 would need to occur between –1.1 and 0 seconds).

<sup>2</sup>The frontal air bag warning lamp is the readiness indicator specified in S4.5.2 of FMVSS No. 208.

<sup>3</sup>The ignition cycle at the time of download is not required to be recorded at the time of the crash, but shall be reported during the download process.

(b) *Data elements required for vehicles under specified conditions.* Each vehicle equipped with an EDR must record each of the data elements listed in column 1 of Table II for which the vehicle meets the condition specified in column 2 of that table, during the interval/time and at the sample rate specified in that table.

TABLE II—DATA ELEMENTS REQUIRED FOR VEHICLES UNDER SPECIFIED MINIMUM CONDITIONS

Data element name	Condition for requirement	Recording interval/time <sup>1</sup> (relative to time zero)	Data sample rate (per second)
Lateral acceleration .....	If recorded <sup>2</sup> .....	0 to 250 ms .....	100
Longitudinal acceleration .....	If recorded .....	0 to 250 ms .....	100
Normal acceleration .....	If recorded .....	0 to 250 ms .....	100
Delta–V, lateral .....	If recorded .....	0 to 250 ms, or 0 to End of Event Time plus 30 ms, whichever is shorter.	100
Maximum delta–V, lateral .....	If recorded .....	0 to 300 ms, or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Time, maximum delta–V, lateral .....	If recorded .....	0 to 300 ms, or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Time, maximum delta–V, resultant	If recorded .....	0 to 300 ms, or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Engine RPM .....	If recorded .....	–5.0 to 0 sec .....	2
Vehicle roll angle .....	If recorded .....	–1.0 up to 5.0 sec <sup>3</sup> .....	10
ABS activity (engaged, non-engaged).	If recorded .....	–5.0 to 0 sec .....	2
Stability control (on, off, engaged) ..	If recorded .....	–5.0 to 0 sec .....	2
Steering input .....	If recorded .....	–5.0 to 0 sec .....	2
Safety belt status, right front passenger (buckled, not buckled).	If recorded .....	–1.0 sec .....	N/A
Frontal air bag suppression switch status, right front passenger (on, off, or auto).	If recorded .....	–1.0 sec .....	N/A
Frontal air bag deployment, time to nth stage, driver <sup>4</sup> .	If equipped with a driver's frontal air bag with a multi-stage inflator.	Event .....	N/A
Frontal air bag deployment, time to nth stage, right front passenger <sup>4</sup> .	If equipped with a right front passenger's frontal air bag with a multi-stage inflator.	Event .....	N/A
Frontal air bag deployment, nth stage disposal, driver, Y/N (whether the nth stage deployment was for occupant restraint or propellant disposal purposes).	If recorded .....	Event .....	N/A

TABLE II—DATA ELEMENTS REQUIRED FOR VEHICLES UNDER SPECIFIED MINIMUM CONDITIONS—  
Continued

Data element name	Condition for requirement	Recording interval/time <sup>1</sup> (relative to time zero)	Data sample rate (per second)
Frontal air bag deployment, nth stage disposal, right front passenger, Y/N (whether the nth stage deployment was for occupant restraint or propellant disposal purposes).	If recorded .....	Event .....	N/A
Side air bag deployment, time to deploy, driver.	If recorded .....	Event .....	N/A
Side air bag deployment, time to deploy, right front passenger.	If recorded .....	Event .....	N/A
Side curtain/tube air bag deployment, time to deploy, driver side.	If recorded .....	Event .....	N/A
Side curtain/tube air bag deployment, time to deploy, right side.	If recorded .....	Event .....	N/A
Pretensioner deployment, time to fire, driver.	If recorded .....	Event .....	N/A
Pretensioner deployment, time to fire, right front passenger.	If recorded .....	Event .....	N/A
Seat track position switch, foremost, status, driver.	If recorded .....	–1.0 sec .....	N/A
Seat track position switch, foremost, right front passenger.	If recorded .....	–1.0 sec .....	N/A
Occupant size classification, driver	If recorded .....	–1.0 sec .....	N/A
Occupant size classification, right front passenger.	If recorded .....	–1.0 sec .....	N/A
Occupant position classification, driver.	If recorded .....	–1.0 sec .....	N/A
Occupant position classification, right front passenger.	If recorded .....	–1.0 sec .....	N/A

<sup>1</sup> Pre-crash data and crash data are asynchronous. The sample time accuracy requirement for pre-crash time is –0.1 to 1.0 sec (e.g., T = –1 would need to occur between –1.1 and 0 seconds).

<sup>2</sup> “If recorded” means if the data is recorded in non-volatile memory for the purpose of subsequent downloading.

<sup>3</sup> “Vehicle roll angle” may be recorded in any time duration –1.0 to 5.0 seconds is suggested.

<sup>4</sup> List this element n—1 times, once for each stage of a multi-stage air bag system.

[73 FR 2181, Jan. 14, 2008; 73 FR 8408, Feb. 13, 2008]

EFFECTIVE DATE NOTE: At 76 FR 47486, Aug. 5, 2011, § 563.7 was amended by revising Table I in paragraph (a) and Table II in paragraph (b), effective October 4, 2011. For the convenience of the user, the revised text is set forth as follows:

**§ 563.7 Data elements.**

(a) \* \* \*

TABLE I—DATA ELEMENTS REQUIRED FOR ALL VEHICLES EQUIPPED WITH AN EDR

Data element	Recording interval/time <sup>1</sup> (relative to time zero)	Data sample rate (samples per second)
Delta-V, longitudinal .....	0 to 250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	100
Maximum delta-V, longitudinal .....	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Time, maximum delta-V .....	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Speed, vehicle indicated .....	–5.0 to 0 sec .....	2
Engine throttle, % full (or accelerator pedal, % full) .....	–5.0 to 0 sec .....	2
Service brake, on/off .....	–5.0 to 0 sec .....	2
Ignition cycle, crash .....	–1.0 sec .....	N/A
Ignition cycle, download .....	At time of download <sup>3</sup> .....	N/A
Safety belt status, driver .....	–1.0 sec .....	N/A
Frontal air bag warning lamp, on/off <sup>2</sup> .....	–1.0 sec .....	N/A
Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, driver.	Event .....	N/A

TABLE I—DATA ELEMENTS REQUIRED FOR ALL VEHICLES EQUIPPED WITH AN EDR—Continued

Data element	Recording interval/time <sup>1</sup> (relative to time zero)	Data sample rate (samples per second)
Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, right front passenger.	Event .....	N/A
Multi-event, number of event .....	Event .....	N/A
Time from event 1 to 2 .....	As needed .....	N/A
Complete file recorded (yes, no) .....	Following other data .....	N/A

<sup>1</sup>Pre-crash data and crash data are asynchronous. The sample time accuracy requirement for pre-crash time is –0.1 to 1.0 sec (e.g., T = –1 would need to occur between –1.1 and 0 seconds.)

<sup>2</sup>The frontal air bag warning lamp is the readiness indicator specified in S4.5.2 of FMVSS No. 208, and may also illuminate to indicate a malfunction in another part of the deployable restraint system.

<sup>3</sup>The ignition cycle at the time of download is not required to be recorded at the time of the crash, but shall be reported during the download process.

(b) \* \* \*

TABLE II—DATA ELEMENTS REQUIRED FOR VEHICLES UNDER SPECIFIED MINIMUM CONDITIONS

Data element name	Condition for requirement	Recording interval/time <sup>1</sup> (relative to time zero)	Data sample rate (per sec- ond)
Lateral acceleration .....	If recorded <sup>2</sup> .....	N/A .....	N/A
Longitudinal acceleration .....	If recorded .....	N/A .....	N/A
Normal acceleration .....	If recorded .....	N/A .....	N/A
Delta-V, lateral .....	If recorded .....	0–250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	100
Maximum delta-V, lateral .....	If recorded .....	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Time maximum delta-V, lateral .....	If recorded .....	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Time for maximum delta-V, result- ant.	If recorded .....	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A
Engine rpm .....	If recorded .....	–5.0 to 0 sec .....	2
Vehicle roll angle .....	If recorded .....	–1.0 up to 5.0 sec <sup>3</sup> .....	10
ABS activity (engaged, non-en- gaged).	If recorded .....	–5.0 to 0 sec .....	2
Stability control (on, off, or en- gaged).	If recorded .....	–5.0 to 0 sec .....	2
Steering input .....	If recorded .....	–5.0 to 0 sec .....	2
Safety belt status, right front pas- senger (buckled, not buckled).	If recorded .....	–1.0 sec .....	N/A
Frontal air bag suppression switch status, right front passenger (on, off, or auto).	If recorded .....	–1.0 sec .....	N/A
Frontal air bag deployment, time to nth stage, driver <sup>4</sup> .	If equipped with a driver's frontal air bag with a multi-stage inflator.	Event .....	N/A
Frontal air bag deployment, time to nth stage, right front passenger <sup>4</sup> .	If equipped with a right front pas- senger's frontal air bag with a multi-stage inflator.	Event .....	N/A
Frontal air bag deployment, nth stage disposal, driver, Y/N (whether the nth stage deploy- ment was for occupant restraint or propellant disposal purposes).	If recorded .....	Event .....	N/A
Frontal air bag deployment, nth stage disposal, right front pas- senger, Y/N (whether the nth stage deployment was for occu- pant restraint or propellant dis- posal purposes).	If recorded .....	Event .....	N/A
Side air bag deployment, time to deploy, driver.	If recorded .....	Event .....	N/A
Side air bag deployment, time to deploy, right front passenger.	If recorded .....	Event .....	N/A

TABLE II—DATA ELEMENTS REQUIRED FOR VEHICLES UNDER SPECIFIED MINIMUM CONDITIONS—  
Continued

Data element name	Condition for requirement	Recording interval/time <sup>1</sup> (relative to time zero)	Data sample rate (per second)
Side curtain/tube air bag deployment, time to deploy, driver side.	If recorded .....	Event .....	N/A
Side curtain/tube air bag deployment, time to deploy, right side.	If recorded .....	Event .....	N/A
Pretensioner deployment, time to fire, driver.	If recorded .....	Event .....	N/A
Pretensioner deployment, time to fire, right front passenger.	If recorded .....	Event .....	N/A
Seat track position switch, foremost, status, driver.	If recorded .....	– 1.0 sec .....	N/A
Seat track position switch, foremost, status, right front passenger.	If recorded .....	– 1.0 sec .....	N/A
Occupant size classification, driver.	If recorded .....	– 1.0 sec .....	N/A
Occupant size classification, right front passenger.	If recorded .....	– 1.0 sec .....	N/A
Occupant position classification, driver.	If recorded .....	– 1.0 sec .....	N/A
Occupant position classification, right front passenger.	If recorded .....	– 1.0 sec .....	N/A

<sup>1</sup>Pre-crash data and crash data are asynchronous. The sample time accuracy requirement for pre-crash time is –0.1 to 1.0 sec (e.g. T = –1 would need to occur between –1.1 and 0 seconds.)

<sup>2</sup>“If recorded” means if the data is recorded in non-volatile memory for the purpose of subsequent downloading.

<sup>3</sup>“vehicle roll angle” may be recorded in any time duration; –1.0 sec to 5.0 sec is suggested.

<sup>4</sup>List this element n – 1 times, once for each stage of a multi-stage air bag system.

**§ 563.8 Data format.**

(a) The data elements listed in Tables I and II, as applicable, must be reported in accordance with the range, accuracy, and resolution specified in Table III

TABLE III—REPORTED DATA ELEMENT FORMAT

Data element	Minimum range	Accuracy	Resolution
Lateral acceleration .....	– 5 g to +5 g .....	±10% .....	0.5 g.
Longitudinal acceleration .....	– 50 g to +50 g .....	±10% .....	0.5 g.
Normal acceleration .....	– 5 g to +5 g .....	±10% .....	0.5 g.
Longitudinal delta-V .....	– 100 km/h to + 100 km/h .....	±10% .....	1 km/h.
Lateral delta-V .....	– 100 km/h to + 100 km/h .....	±10% .....	1 km/h.
Maximum delta-V, longitudinal .....	– 100 km/h to + 100 km/h .....	±10% .....	1 km/h.
Maximum delta-V, lateral .....	– 100 km/h to + 100 km/h .....	±10% .....	1 km/h.
Time, maximum delta-V, longitudinal.	0–300 ms, or 0–End of Event Time plus 30 ms, whichever is shorter.	±3 ms .....	2.5 ms.
Time, maximum delta-V, lateral.	0–300 ms, or 0–End of Event Time plus 30 ms, whichever is shorter.	±3 ms .....	2.5 ms.
Time, maximum delta-V, resultant.	0–300 ms, or 0–End of Event Time plus 30 ms, whichever is shorter.	±3 ms .....	2.5 ms.
Vehicle roll angle .....	– 1080 deg to + 1080 deg .....	±10% .....	10 deg.
Speed, vehicle indicated .....	0 km/h to 200 km/h .....	±1 km/h .....	1 km/h.
Engine throttle, percent full (accelerator pedal percent full).	0 to 100% .....	±5% .....	1%.
Engine RPM .....	0 to 10,000 rpm .....	± 100 rpm. ....	100 rpm.
Service brake (on, off) .....	On and Off .....	N/A .....	On and Off.
ABS activity .....	On and Off .....	N/A .....	On and Off.
Stability control (on, off, engaged).	On, Off, Engaged .....	N/A .....	On, Off, Engaged.
Steering input .....	– 250 deg CW to + 250 deg CCW.	±5% .....	1%.
Ignition cycle, crash .....	0 to 60,000 .....	±1 cycle .....	1 cycle.
Ignition cycle, download .....	0 to 60,000 .....	±1 cycle .....	1 cycle.
Safety belt status, driver .....	On or Off .....	N/A .....	On or Off.
Safety belt status, right front passenger.	On or Off .....	N/A .....	On or Off.